The Boston Medical and Surgical Journal

TABLE OF CONTENTS

April 15, 1920

ORIGINAL ARTICLES

Gas Bacillus Infection in Civil Practice. *By Ernest L. Hunt, M.D., F.A.C.S.*, Worcester, Mass. 385
The "Common Cold" in Relation to Certain Microörganisms, and its Treatment with Bacterial Vaccines. *By Cleaveland Floyd, M.D.*, Boston. 389
X-Ray Diagnosis and Therapy. *By Ester M. Sundelöf, M.D.*, Lynn, Mass. 393
The Surgical Treatment of Chronic Empyema. *By Wyman Whittemore, M.D., F.A.C.S.*, Boston. 396

CLINICAL DEPARTMENT

An Unusual Case of Myelitis. *By Arthur L. Kinne, M.D.*, Holyoke, Mass. 398

BOOK REVIEWS

The Operative Treatment of Chronic Intestinal Stasis. By Sir W. Arbuthnot Lane, Bart. 399
Oxford Loose-Leaf Surgery. Edited by F. F. Burghard, M.S., F.R.C.S. 399

THE MASSACHUSETTS MEDICAL SOCIETY

Directory of Massachusetts Medical Society. 400
Directory of Officers and Fellows for 1920. ......facing 400

EDITORIALS

The Menace of European and Asiatic Diseases. 401
South American Surgeons. 402
The Value of Nitrous-Oxide-Oxygen Anaesthesia in Military and in Civilian Practice. 404
Westward Migration of Indigent Tuberculous Persons. 405
Medical Missionary Work in China. 406
The Longevity of Physicians. 406
Biography of Sir William Osler. 407
Registered Physician in Avon, Massachusetts. 407
Medical Notes. 407

CORRESPONDENCE

Appetite versus Therapeutics. *George Van Ness Dearborn, M.D.* 413

MISCELLANY

United States Civil Service Examination. 414
Society Notices, Recent Deaths, etc. 415

Original Articles.

GAS BACILLUS INFECTIONS IN CIVIL PRACTICE.*

By Ernest L. Hunt, M.D., F.A.C.S., Worcester, Mass.

Since the description by Welch and Nuttall in 1892 of the *Bacillus aerogenes capsulatus* and its recognition as an occasional cause of rapid and fatal septicemia, usually preceded by local death and decomposition of tissues at the site of its entrance, pathologists have met with it at the autopsy table from time to time and surgeons much less frequently in the operating room or ward. W. W. Keen,[1] veteran of three American wars, quotes Bowlby to the effect that it is practically unknown in Great Britain and adds, "The same is true in the United States. Personally I never saw a single case in the Civil War, and but one in civil life since then." The lesions of this organism, though infrequently seen, had come to be greatly dreaded—in Welch's 46 cases the mortality had been 59%—even before the great war came to let loose its terrible destructive agents under conditions which favored wound infections of the most desperate and unusual character, and of a virulence hardly dreamed of by the present generation of surgeons, educated as most of them were in civil hospitals in an aseptic age. Nor had the experiences of the Russo-Japanese or Boer War prepared the medical mind for what was to occur in Belgium and northern France, where the much tilled soil teemed with bacteria of many kinds, being particularly rich in that group of spore forming anerobes, of which the tetanus and gas bacilli are the most prominent examples. Thus, during the great retreat from Belgium and the subsequent trench warfare, before the medical forces were organized to combat it effectually, gas gangrene was a constant menace and claimed its thousands of victims, at least 70%[1] of the wounds being contaminated with material bearing spores of these germs. Through this enormous experience, however, the clinical manifestations and pathology became thoroughly understood, and the surgical treatment standardized, so that the incidence of gangrene in adequately treated cases dropped from a very high figure to a fraction of 1%.[2]

That gas bacillus infections are more common in traumatic cases occurring in civil practice than pre-war literature had led us to suppose has been impressed upon me both by experience at Worcester City Hospital since my return and by looking up certain cases of which

---

* Read before the Worcester District Medical Society, December 10, 1919.

I had knowledge prior to entering military service. Thus, from our experience in medicolegal autopsies on abortion cases, Dr. F. H. Baker and I had come to accept Dr. Welch's suggestion that cases of so-called air embolism were, in reality, cases of gas bacillus septicemia; sudden deaths in convulsions with cyanosis being characteristic, as the following two cases well illustrate.

(1) —— A young married woman living in a rather old and ill-kept tenement house attempted to produce abortion with a piece of glass tubing like a drinking tube. She had a chill that night, but next day, being disappointed with results, repeated the attempt and while in the act developed a convulsion and expired almost immediately. Autopsy and rabbit inoculation established the etiology. Frothy blood throughout the body was the striking feature of the post-mortem findings.

(2) ——. On a very hot day a few summers ago I was called to investigate the death of a young Finnish woman. The relatives denied all knowledge of pregnancy or attempted abortion, but the husband admitted that she received a visit from an unknown woman two days previously. During the previous night complained of weakness, slept poorly and flowed slightly. Restless with increased flowing after midnight. Had pains all the forenoon but refused to have a physician called. About 3.30 P.M., after taking ergot from a physician who was too busy to come, was seized with a convulsion, lapsed into unconsciousness and expired at 4.25. An ordinary douche bag with blood stained tip was found in her trunk. The bed was soiled with putrid smelling blood. Autopsy showed that a miscarriage had occurred and that death was due to gas bacillus septicemia.

Referring to the City Hospital records, I find that in six years prior to July, 1919, there have been four cases of gas gangrene following trauma of the extremities, three of which were treated by multiple incisions and antiseptics, with two deaths and one treated by amputation at the shoulder, with recovery. It should be added that the diagnoses in these cases were based on the clinical findings and not confirmed by cultures.

Since August 1, 1919, there have been three cases of gas gangrene on the services of Drs. F. W. George, G. H. Hill, and the writer. As these are characteristic of the types of injury in which this infection is encountered, a brief résumé of each is worth considering.

CASE 1. E. J., male, 11 years old, admitted August 8, 1919. Injury—Jumped from top of fence to catch limb of tree, missed, fell to roadside, driving elbow into dirt, the lower end of humerus being pushed out through the skin anteriorly about 1½ inches. Much roadside dirt was drawn into wound.

Operation about three hours after injury—benzine and iodine preparation. Skin wound enlarged and fringes trimmed away, counter incision made posteriorly above external condyle, dislocation reduced, wound wiped thoroughly with 5% dichloramine-T and partly closed with gauze drainage: dry dressing, and posterior right angle splint. One thousand units of tetanus antitoxin given.

August 9, temperature 100°, pulse 80, complaint of pain in arm; hand warm and of good color. August 10—pain very severe; temperature 103° during night, required morphine. Arm swollen and reddish brown in color, several blisters about wound. On withdrawing wick, a reddish, thin, foul smelling, frothy fluid oozed out and tissue crepitation could be felt extending to mid-humeral region. Discoloration of skin extended to level of deltoid insertion in front and to shoulder in back. Under light ether, axillary vessels were tied and a noflap shoulder joint amputation done, cutting away devitalized skin well up on posterior surface of shoulder. Under Carrel-Dakin irrigations and careful dressings, which for days required gas-oxygen anesthesia, patient made a good recovery and is well today. Cultures showed a spore bearing rod which fermented dextrose agar in seven hours. X-ray showed focus of gas at elbow extending up arm.

CASE 2. W. R. A., male, 20. Admitted November 15, 1919. While riding in a side car of motorcycle collided with a truck, sustaining severe compound fracture of both bones of right leg at middle, and simple fracture of both bones of left leg. Entered in severe shock and considerably depleted of blood by hemorrhage. Refused amputation. Bleeding was controlled by tourniquet. Most of muscles and anterior tibial vessels were severed. Wound cleaned of street dirt, trimmed and thoroughly irrigated with quantities of saline solution followed by iodine, packed lightly, dressed, put in pillow and side splints. Fifteen hundred units tetanus antitoxin. Later put up in posterior wire splint and cast applied to the other leg. Saline intravenous at operation.

November 16—Symptoms of acute anemia were marked and he was transfused, receiving 450 cc. of citrated blood from a Group IV donor, which was followed by a chill and sweating for about one hour; thereafter he seemed much improved. Right foot cold and no pulsation felt. During early afternoon complained of great pain in leg. Wound inspected again at 5.10 P.M.; tissues dry, no odor noted, but there was swelling about the knee. At 10.20 P.M., an odor as of decaying flesh noticed and there was a reddish streak along the course of the internal saphenous vein. Tissue crepitus could be felt extending eight inches above the patella. Smears showed Gram-positive rods with spores. General condition much less favorable. Amputation with coincident transfusion decided upon and attempted under gas oxygen, with death on the table. Highest range of temperature 103^2; urine, 1030, many casts and leucocytes.

CASE 3. C. H. W., 53, farmer. November 22, 1919, ran gloved hand into corn husking machine at 11.50 A.M., arrived at hospital about 1 P.M. Refused amputation by advice of his employer, although the left hand was extensively crushed and lacerated, the details of injuries being compound dislocation of second and third metacarpal joints, compound comminuted fracture of fourth metacarpal bone and compound fracture of fifth metacarpal at the carpometacarpal joint, deep palmer arch was destroyed and tendons of little finger torn away. The usual accident room cleansing and repair was done and 1500 units of tetanus antitoxin given. All the next day he complained of pain. At 9 A.M. on second day, dressing was removed revealing well developed gangrene with skin nearly black as high as wrist and reddish brown to elbow with tissue crepitus extending four inches above elbow. Amputation at mid-humerus was done and patient is making a good recovery. Cultures in glucose agar gave gas production and the growth showed the usual type of organism, associated with diplococci.

That we were taken somewhat unawares by the fulminant character of the invasion in the first two cases may be conceded—in the third, though thoroughly warned, yet the involvement had reached the mid-humeral region when discovered. It is fair to state also that in cases 2 and 3 it was the judgment of the surgeons that the injuries called for amputations but, as occurs so often, the patients' reluctance to sacrifice a limb jeopardized their lives. That three such cases should occur in the space of four months is a sufficient warning that others may be looked for and compels the attention of those who do traumatic surgery to a detailed understanding of the points upon which an early diagnosis may be based, full knowledge of how to meet it, and courage to act promptly when the need appears.

To begin with, one should always have in mind the fundamental conditions which determine its occurrence and govern its prevention.

Firstly, these anaerobes occur in natural fertilizers, garden soil, street dirt or anything which may be soiled thereby, such as clothing, shoes, tools, carriages, automobiles, horses' hoofs, etc. Consequently, patients with wounds in which contamination by such materials can have taken place must be regarded as potential gangrene cases.

Secondly, as these organisms may be both saccharolytic and proteolytic, the glycogen and protein of muscle offer suitable pabula for their growth, but they cannot develop in normal muscle because of the oxygen which is being constantly supplied by the unimpaired circulation of blood; consequently, an essential to their active development is muscle tissue which from trauma, constriction or other cause has become devitalized. Therefore, severe injuries, like compound fractures, shell or gunshot wounds, which lacerate muscles as well as introduce the germs, are most favorable to the development of the disease. This is particularly true if the major blood supply is seriously impaired either by traumatization of vessels, prolonged application of tourniquet, tight bandages, etc.

Thirdly, being anaerobes, their growth is favored by closure of the wound and symbiosis with the pyogenic germs. As they produce gas a closed wound interferes with its escape, favors its spread along fascia planes and between muscle bundles where by its pressure the tissues are further devitalized.

Fourthly, besides producing gas, their growth hemolyses blood, produces a toxic substance, and a foul, putrid, sanguinous fluid. This toxin is the probable cause of the sudden fatal termination so often seen, although apparently a generalized infection with emphysema occurs shortly before death and is more likely to occur early where large veins are included in the traumatized tissue.

Fifthly, chlorine solutions have been shown to neutralize or destroy this toxin.

Sixthly, if the conditions are favorable to this growth, it takes place rapidly so that such wounds must be observed very frequently until the danger period is past.

Seventhly, being spore bearers, they may remain latent in healed tissue for many months and gangrene may result when a secondary operation is undertaken.

In applying these principles it should always be understood that there are several varieties of gangrene producing germs and the clinical manifestations are not always classical. As Christopher[3] remarks, "The clinician should consider it a disease of multiple etiology in which the chief symptom is not always the same."

It is also to be recognized that wounds known to be infected with these organisms, may not, and often do not develop the disease, nevertheless, cases in which the disease may be developing must be closely and vigilantly studied.

CLINICAL MANIFESTATIONS OF THE DISEASE.

To my mind the earliest and most suggestive symptom is *pain in the affected limb*, which is wholly out of proportion to what would ordinarily be expected in such a wound and develops within a few hours—much earlier than does that of ordinary sepsis. With this is a moderate temperature and a disproportionately high pulse and respiration. In addition to the pain there is local swelling, complaint that the bandages are too tight, and possibly numbness of the extremity below the wound. The skin becomes reddish brown in color and blebs develop near the wound. The skin edges turn dark and the area is exquisitely tender. Here the x-ray may confirm the presence of gas deep in the wound and it is usually detected first in neighborhood of a foreign body if one remains in the tissues. A reddish brown ooze soon occurs, smears of which show many Gram-positive, large rods with oval ends and frequently containing spores. Cultures from this in deep glucose agar develop gas in five to seven hours, with fracture of the agar and separation of the fragments. Tissue crepitus can usually be felt and in general corresponds in distribution to the area of dull reddish discoloration, but swelling and crepitus may extend beyond the discoloration beneath normal looking skin. The patient's mind is usually alert and clear, vomiting is rare. Taylor's explosive stage is reached in from 24 to 36 hours, when the distention of tissues is intense; foul, putrid, foamy discharge oozes from the wound and the condition is very evidently a gangrenous process. The stage of systemic intoxication rapidly merges in to the stage of septicemia, and death ensues.

Pratt[4] attributes great diagnostic value to an early board-like hardness of the limb below the wound which he interprets as a segmental cadavaric rigidity. I have not personally observed this sign.

TREATMENT.

We have to consider treatment under two phases, which are determined by the period at which the case comes under observation and may be preventive or curative accordingly.

Preventive. This obviously begins with the one who renders first aid at the scene of accident and is of course largely beyond control. Should a trained person be present he may render great service by cutting away clothing, protecting the wound by a clean dressing lightly applied and supportive splinting. *He may do grave harm by reducing a protruding bone or applying tourniquet or splints unnecessarily or too tightly.*

At operation the surgeon should determine the bacteriologic condition of the wound by swabbing the interior and having smears stained and examined at once. The presence of Gram-positive rods and their relative numbers should warn him as to his procedure though their absence should not wholly allay his fears. He should cause cultures in deep glucose agar to be made by inoculating with the swab and a bit of the injured muscle. These should be put in the incubator forthwith and inspected for gas within six or seven hours. He then must thoroughly cleanse the wound, lay it open freely, remove all foreign matter, cut away traumatized skin fringes and muscle ends, ascertain condition of blood supply, being very careful to avoid important trunk vessels, preserving such bony fragments as are well attached to periosteum and needed to establish continuity of the repair process. Attention to the muscle ends is of first importance and they should be trimmed down to healthy tissue which can be recognized by the occurrence of bleeding and the normal color. It is necessary to get into all recesses of the wound and clean it up. Carrel-Dakin tubes wound with gauze should then be inserted to the innermost recesses and retained by an occasional fine catgut stitch with care that they shall not unduly press upon the blood supply, pack rest of wound lightly with gauze, apply strips of gauze bandage soaked in sterile vaseline to skin, apply a liberal, soft, absorbent dressing and wire hammock splints if they are available, avoiding undue constriction at any point. Probably it is best to use Dakin's solution by hourly flushing. Inspect limb at least at four-hourly intervals; if any of the symptoms detailed above appear, or the culture shows gas production, do not hesitate to remove dressings at each inspection. At least once daily take smears from inside the wound for bacterial count.

Antitoxin. Numerous antitoxic sera were used by the French as prophylactic and curative agents with encouraging results. Sacquipée[5] advises that treatment begin at once with a polyvalent serum, followed by the serum for the particular strain of bacillus as soon as that is determined by his method of inoculating guinea pigs with material from the wound, against known antitoxins—the pig that gets the right one lives, the rest die. In 191 cases of the disease 86.91 recovered. Preventive value is also claimed for the polyvalent serum.

Antitoxin cannot, however, be said to have gained widespread confidence, nor is it at present available for general use. Prompt and thorough operative treatment is still the only safe reliance and its efficiency is so high that it can be safely neglected for *no other method.*

TREATMENT AFTER DISEASE HAS DEVELOPED.

This is, of course, operative, the type of operation must depend upon the stage the disease has attained when it is recognized, and the choice of operation requires nice judgment on the part of the surgeon. If it be discovered in the early, local stage, the procedure should be free opening of the involved areas with careful anatomical separation of fascia layers down to the bone, avoiding major circulation channels, and excising all the devitalized muscle, which can be recognized by its brick red color, friability and failure to contract when pinched or cut. It may be necessary to excise the entire belly of a muscle or a whole muscle group. Most writers advise long longitudinal, but Hugh Cabot[6] advises transverse incisions. Then carry out the Carrel-Dakin method as advised above.

If not recognized until the explosive stage, when the limb is massively swollen, crepitant and discolored, the wise operator will unhesitatingly amputate by the guillotine method well above the involved areas although at times the extension may be greater on one side than the other and the amputation may be oblique, saving enough skin for a secondary covering in.

With these methods of treatment, even without the aid of preventive serum, gas gangrene is a preventable complication. The difficulty is that in civil practice we are not accustomed to anticipate its occurrence, so are satisfied with less radical primary treatment, protecting against tetanus by means of that valuable antitoxin. In the light of our experience at Worcester City Hospital it seems to me that we must disabuse our minds of complacency in respect to this infection and carry it upon our consciences to make our preliminary treatment of wounds of this character 100% efficient, and our post-operative care sufficiently keen and wide-awake to detect it while it is yet in the local stage, thereby saving our patients from mutilating operation or loss of life.

[Note. In the discussion following the reading of this paper Dr. B. H. Alton reported a case now under his care at Memorial Hospital caused by a gunshot wound of the popliteal space, which he had saved by mid-thigh amputation. He pointed out the importance of acidosis as a factor in the rapidly fatal character of the disease and said that 1000 cc. of 2% sodium bicarbonate solution intravenously was of greater value than transfusion. He also remarked that in his case the infection seemed less virulent than the many he had experienced on the Flanders front.

Dr. P. H. Cook said that roentgenologists distinguish two forms of gas infiltration, one being characterized by extension along fascia planes perhaps in but one sector of a limb, the other characterized by extension also through the muscles in the interfibrillar spaces, giving a massive emphysema involving whole muscle or muscle groups. The former offers more favorable opportunity for conservative surgery while the latter requires extensive operation or amputation.]

REFERENCES.

[1] Keen: Treatment of War Wounds. Philadelphia, 1917.
[2] Sieur and Mercier: Bull. de l'Académie de Méd., 1918. No. 43, p. 394. Abst. Jour. A. M. A.
[3] Christopher, F.: The Early Diagnosis of Gas Gangrene, Jour. A. M. A., Vol. lxxii, No. 6, p. 407.
[4] Prat: Presse Médical, March 24, 1917. Abst. Jour. A. M. A.
[5] Sacquipée and De Levergne: Paris letter, Jour. A. M. A., Jan. 24, 1918.
[6] Hugh Cabot's letter in Keen's "Treatment of War Wounds."

◆

THE "COMMON COLD" IN RELATION TO CERTAIN MICROÖRGANISMS AND ITS TREATMENT WITH BACTERIAL VACCINES.

By Cleaveland Floyd, M.D., Boston.

The term "common cold" is used in this connection to describe the infection of the various respiratory passages seen so commonly here in the winter.

During the past five years increasing attention has been centered in acute respiratory infections on account of a number of epidemics of increasing severity which have occurred in various parts of this country. Scientific interest has somewhat lapsed in this matter since the demonstration by Pfeiffer in 1890 of the influenza bacillus, and its designation as the cause of that group of symptoms commonly termed "la grippe." Confirmation of Pfeiffer's findings by Kitasato, Pfuhl, and Cannon, together with other observers, led to the belief that this organism was primarily responsible for practically all the severe winter infections of the upper respiratory tract. Prior investigations by Weichselbaum, Ribbot, Bouchard and Saccond, who had found from bacteriological investigations, streptococci and pneumococci as the predominating organisms in this class of disease, were discarded, and it has only been through a re-investigation of this subject that the true place of the influenza bacillus in respiratory infections has been proved. Since 1894, there have been an increasing number of observations, among which may be cited those of Kleinbeger, Krause, Lord and Bezançon, who have investigated the connection of the influenza bacillus with acute respiratory disease, and while at times finding the organism of Pfeiffer, have with much greater regularity, found streptococci and pneumococci, together with other organisms, in abundance.

Investigations of the "common cold", by anaerobic methods and the search for a filterable virus as an etiological cause, have given rise to some interesting observations. In cases of rhinitis, Tunnicliff has described a small microorganism, which she found fairly regularly in the early stages of acute coryza. Experimental work with dogs has shown that fairly typical attacks might be produced with this microorganism.

The work of Krause, more recently supplemented by that of Foster, on the question of a filterable virus in cases of rhinitis has shown that by means of filterable products in acute nasal infection, substances were obtained which, experimentally in human beings, would reproduce the infection when inoculated into the nose.

A widespread epidemic of acute respiratory infections, occurring generally in this country during the winter of 1915-1916, was carefully investigated by Mathers in Chicago. As a result of the use of aerobic, anaerobic and filtration methods in a study of some sixty-one cases the organisms found greatly to predominate were the hemolytic streptococcus, the streptococcus viridans and the pneumococcus. The presence of the bacillus of influenza occurred only in one case.

The work of Dochez, Gillespie, Avery, Stillman and others on the pneumococcus have brought out many facts in regard to the presence of this organism in the upper respiratory passages. Stillman, in a study of 390 normal individuals, found that in the saliva fully one-third carried a pneumococcus, the more avirulent types predominating. Dochez and Avery in a study of contacts in cases of pneumonia found that a very considerable percentage became carriers of virulent types of the pneumococcus.

These and other investigations point to the importance of those organisms included in the groups of streptococci and pneumococci as playing a predominant rôle in acute respiratory diseases rather than certain other microörganisms, such as the bacillus of influenza.

The present work, which runs back several years, has concerned itself almost entirely with a study of the streptococcus and pneumococcus groups of organisms as they have appeared in various phases of the "common cold". This work was begun during the winter of 1913-14 and continued during the winters of 1915-16-17-18. An effort has been made to determine the type of "common cold" in relation to the presence of one of the members of the pneumococcus or streptococcus groups, and to see what could be done to control these various infections by the use of bacterial vaccines. The types of streptococci encountered have been determined through their action on blood agar, fermentation of a variety of sugars, and their virulence, in some instances, toward animals. For the last three years, where the pneumococcus has been encountered, a study of types has been carried on in connection with therapeutic measures.

METHODS.

On account of the large bacterial flora commonly found in the naso-pharynx every effort has been made in this study to secure culture material as early as possible after the onset of the disease. Those cases included in this series are, threfore, only those in which such material was secured within thirty-six hours of onset, and this in part accounts for the irregular distribution of the type of cases studied. In those cases where the time elapsed from the onset of the infection was a matter of a few hours, cultures were secured through means of protected swabs from the turbinate region in cases of coryza, from the soft palate in cases of a burning red throat and from washed bits of tracheal or laryngeal secretion where the onset of the disease pointed to an infection in this location.

Aerobic and anaerobic cultures were planted in plain broth, acitic broth, litmus milk, blood agar, dextrose agar and dextrose acitic agar. At the end of eighteen to twenty-four hours isolated colonies were transferred and pure cultures of pneumococci or streptococci were tested for animal virulence, then action on blood agar and fermentation of sugars. In many instances, a number of strains of these organisms were studied in each individual case. Where a local epidemic was in progress in an institution as many cultures as possible were studied by these methods to determine if there was a common organism present as an etiological factor.

During the winter 1913-14 in a series of seventy selected cases where there was an invasion of the upper respiratory passages, sixteen showed an initial infection in the tonsillar region, forty on the uvula and soft palate, four on the mucous membrane of the nose, and ten in the larynx and trachea.

During the fall and winter of 1914-15 a series of thirty-five cases was investigated, a few being taken each month, beginning with the month of October, in order to note any change in the type of organisms in these infections during the winter months. A summary of this investigation shows the predominating organism to be hemolytic streptococcus in twenty-three observations, the streptococcus viridans in five, a non-hemolytic streptococcus in sixty-one and the pneumococcus in twenty.

During the winters of 1915-16-17-18, similar work has been carried on chiefly among cases of acute laryngitis and tracheo-bronchitis. The pneumococcus has been most commonly found, Type IV predominating; although Types I and II have not been infrequent. The same organism was obtained in some twenty-five cases of laryngitis and bronchitis occurring in the late spring of the year. The pneumococcus thus recovered was almost entirely of the Group IV variety, and, following Olmstead's serological classification, most of them fell in the first twelve subgroups.

As a result of observations carried on during the past five years, it has seemed possible to divide the common cold roughly into the following clinical types:

a. Acute rhinitis.
b. Acute pharyngitis. Followed by rhinitis and laryngitis.
c. Acute laryngitis. Followed by tracheitis, bronchitis, and pneumonia.
d. Acute tracheitis. Followed by bronchitis and laryngitis.

Acute rhinitis is characterized by sudden swelling of the nasal mucous membrane, with a watery discharge, fullness in the head and general malaise. The organism commonly found in the secretion belongs to the staphylococcus group, and somewhat less frequently the hemolytic streptococcus has appeared.

Acute pharyngitis is characterized by redness and swelling of the fauces and of the posterior wall of the pharynx, pain on swallowing, dry cough and temperature. The infection may extend into the nose or larynx. Almost invariably, the initial infection is produced by the member of the streptococcus group. The types of cold beginning with laryngitis or trachitis and followed by a rapid extension over the respiratory tract are closely related and generally due to one and the same microörganism. Aside from the local symptoms, the type is accompanied with considerable muscular pain, and the name of grippe is commonly applied to it The pneumococcus of the Group IV, or occasionally of the Groups I and II, is predominant. Occasionally, however, the hemolytic streptococcus has been the original invader. The early fall and winter colds are generally of the first types. The early and late spring colds are of the last two types.

The type of cold originating as laryngotracheitis has frequently appeared in epidemic form in many large cities, and, on account of the severity of its manifestations, some observers have considered it to be due to the bacillus of influenza.

In securing cultures during the first hours of an infection it is generally possible to determine the predominating factor before various other microörganisms, commonly present in the nasal and buccal mucous membrane, have had time to multiply.

The work of Dochez and Avery on the question of the epidemiology of the pneumococcus demonstrates how readily even the virulent strains of the organism are transmitted from person to person and, as Valentine has pointed out, the large numbers of this organism in the secretions of many respiratory infections makes its etiological relationship very suggestive.

It would seem futile on account of the multiplicity of the organisms commonly present and constantly changing on the mucous membranes of the nose and throat to expect that all acute respiratory infections might be due to one microörganism. The filterable virus obtained by Krause and Foster may in some instances be productive of a typical choryza. The anaerobic bacillus of Tunnicliff similarly may be a factor in the production of acute respiratory disease. In other instances, however, these and many other bacterial observations go to show that in the group of streptococci and pneumococci we have at least two of the predominating etiological factors in our winter colds whether primary or secondary.

USE OF BACTERIAL VACCINES.

In view of the fact that so many observers have reported a great predominance of the streptococcus and pneumococcus in various manifestations of the "common cold," and, further, as many of the complications which arise secondary to it have as the predominant organism one or more members of these groups, it seemed worth while to see if something could be done by the simple method of the use of bacterial vaccines to control this type of infection.

In view of the prevailing feeling among bacteriologists that immunity to the streptococcus and pneumococcus is of a very temporary nature, the effort to devise a means of mitigating the effects of the severer colds necessitated the working out of a method of producing some degree of resistance to these groups of organisms which appear so commonly. During the past three winters, 1916-17, 1917-18, 1918-19, a series of observations have been carried out on the use of bacterial vaccines in the treatment and control of acute colds. The type of cases largely dealt with has been that of a person peculiarly susceptible to acute respiratory infection, and, who, on account of this and the incapacity so produced, is willing to adopt any measures that promise relief. The majority of persons in normal health suffer during the course of a year one or more colds, generally in the form of coryza, or as a laryngobronchitis during the late spring months. There is, however, an increasing number of persons in the community where this average is many times exceeded; so much so that in the worst cases a renewed infection may occur every ten days over a period of six or eight months.

While the majority of people will, as a result of an intracutaneous test for sensitization, show a relative susceptibility to one or more of the common microörganisms associated with colds, such cases as those cited will give evidence of marked hypersusceptibility sometimes to one organism, frequently to more than one. This can be shown not only as the result of the intracutaneous test, but has been more fully demonstrated following the subcutaneous inoculation with bacterial vaccines. At times not only marked local reaction occurs, even with a dose well below the average, but constitutional symptoms are also pronounced. This hypersusceptibility apparently explains the cause of many repeated colds, especially from these microörganisms which confer little resistance. It has been noticeable, however, that at times following an acute cold the resistive powers of the individual to the specific microörganism are at least temporarily greatly increased, as shown by their decreased susceptibility, than before such an infection

The method devised has been as follows:

The isolation of members of the staphylococcus, streptococcus and pneumococcus from cases where the infection has been severe, and the preparation of bacterial vaccines from each one of these types of organisms. Therapeutically, early in the fall, three or four inoculations are given of a combination of the vaccines of the streptococcus and staphylococcus groups. In the early part of the winter, a second series of inoculations is given with a combination of the vaccines of the members of the streptococcus and pneumococcus groups, and this is repeated in the early spring. Should a cold develop in the interim, the patient is urged to present himself for inoculation during the first twelve hours of the onset of the infection. One or two inoculations will occasionally bring the cold to a rapid termination. In those cases where abortive colds appear, or where, in spite of inoculations, an extensive infection develops, microörganisms are studied in each instance. and autogenous preparations made and used in subsequent inoculations.

The results of this method have been in some instances unsuccessful, but in the majority the inoculations have materially modified the severity of the types of colds usually endured, and have diminished their frequency. In some individuals practical immunity from acute respiratory infections has been secured. This has been especially the case in those individuals, who have an abnormal susceptibility to this type of infection, and in whom it is not uncommon to see one cold rapidly succeeding another.

The initial work in prophylaxis against pneumonia was inaugurated by Lister in South Africa among the workers in the diamond mines. The result of his observations shows the possibility of the protection of a considerable part of the community by bacterial inoculation through lessening the number of carriers, and, perhaps, the virulence of the strains found in the community.

The recent publication of the work of Cecil and Austin on the results of prophylactic inoculation against the pneumococcus points to the possibility that something can be accomplished in curtailing infections produced by this organism through the injection of large amounts of a combination of types of this microorganism.

Eaton secured favorable results by the use of vaccines in infections of the nose and sinuses where, primarily, the disease was due to the streptococcus, pneumococcus and the bacillus of influenza. It would, therefore, seem, as the result of these observations and those of other observers, that active immunity, even though of temporary duration, may be produced through the use of bacterial vaccines for the members of the streptococcus and pneumococcus groups. Careful study of the microörganisms most commonly concerned, in the individual case, in the production of acute respiratory infections, with the use of frequent inoculations in large quantity of the various types of the microörganisms concerned, promises results not only in the suppression of the common cold, but. also, to go a long way as a prophylactic measure in the relief of its various complications.

CONCLUSIONS.

1. The results of many recent observations point to the predominant place of members of the streptococcus and pneumococcus groups in the etiology of infections of the upper respiratory tract.
2. General classification of the various types of the "common cold" is suggested, and these rest on a fairly constant bacteriological basis.
3. The production of an active immunity through the use of appropriate bacterial vaccines promises to be of value prophylactically in the control of infections of the upper respiratory tract.

BIBLIOGRAPHY.

Wien. klin. Wchnschr., 3, p. 104, 1890.
Ztschr. f. klin. Med., 17, p. 545, 180.
Sem. Méd., 10, p. 35, 1890.
Sem. Méd., 10, p. 51, 1890.
Sem. Méd., 10, p. 93, 1890.
Deutsch. med. Wchnschr., 18, p. 28, 1890.
Deutsch. med. Wchnschr., 18, p. 28, 1892.
Centrabl. f. Bakteriol., II, p. 397, 1892.
Deutsch. med. Wchnschr., 20, p. 513, 1890.
Deutsch. med. Wchnschr., 36, p. 575, 1895.
Bull. de l'Inst. Pasteur, 3, p. 372, 1895.
Publ. Mass. Gen. Hosp., 2, p. 715, 1909.
Jour. Am. Med. Assn., 61, p. 727, 1913.
Jour. Infect. Dis., xxi, p. 1.
Jour. Infect. Dis., xiii, p. 283.
Jour. Med. Research, xxxi, p. 455.
Jour. Exp. Med., xvi, 2, p. 114.
New York Med. Jour., 105, p. 293, 1917.
Jour. Ophth., Otol., Laryngol., 23, p. 530, 1917.
Jour. Exp. Med., 26, p. 97, 1917.
Jour. Exp. Med., 26, p. 513, 1917.
Bull. Johns Hopkins Hospital, 28, p. 306, 1917.
Jour. Exp. Med., 26, p. 537, 1917.
Pub. South Af. Inst. Med. Research, 10, 1917.
Jour. Exp. Med., xxviii, 1, p. 19.
Jour. Am. Med. Assn., lxxi, 8, p. 635.

X-RAY DIAGNOSIS AND THERAPY.*

BY ESTER M. SUNDELÖF, M.D., LYNN, MASS.,

Radiologist at the Lynn Hospital and at the New England Hospital for Women and Children.

MORE and more in my work I realize the limitations as yet bounding all our human endeavors, especially in the field of medical science. The more x-ray work I do the more I realize how much I do not know about medicine and especially about x-ray interpretation. We radiologists do a great many times make brilliant diagnoses; we discover entirely unexpected and interesting lesions; we get gratifying results with our x-ray treatments; we find almost daily something interesting and unusual, something puzzling, and a great many times we battle against discouragements none but radiologists can know. We contend with the perversity of inanimate objects, chemicals, machines, and other things. Unless conditions are as near ideal as possible we cannot, of course, obtain the best results and how often, indeed, are our working conditions ideal? Most of us work with inadequate equipment, inadequate supplies, imperfect machinery, and worst of all, we have insufficient time and assistance with which to study our patients. Most discouraging of all, a doctor can make a mistake in diagnosis but for a roentgenologist to misinterpret a plate is the height of stupidity. The consulting physician will rarely forgive such stupidity nor favor the radiologist with any more cases. I said failure properly to interpret a plate, for I believe a good x-ray plate is a true representation of actual conditions and our mistakes in diagnosis are due often to our inability to perceive slight changes in outline or penetration. Many times I have been overwhelmed with the lack of sympathy which the average doctor displays toward the mistakes made by radiologists. Doctors cannot apparently realize the many sources of error possible, and at times inevitable, which confront us in our work. The size of the patient, the lack of coöperation on the part of the patient, the difficulty of proper focussing, of getting sufficient penetration, neither too much nor too little, but a happy medium which differs for the size, age and muscular development of the individual; the quality of the plates and chemicals, the temperature of the solutions used, the instability of the electric current, and any number of other complications may render imperfect results. Were our mechanical and physical limitations not so great I firmly believe that we could be credited with a larger percentage of correct diagnoses than we are now.

---

* Read before a meeting of the New England Woman's Medical Society, on December 18, 1919.

I took up x-ray work because it represented to me one branch of medicine to which I thought I could pin perfect faith. I have had to battle many times to keep this unbiased faith, especially, when I have made mistakes in diagnosis. I used to be immensely interested in my correct diagnoses; for, as everyone knows, every radiologist scores a high percentage of absolutely correct diagnoses. The finding and localization of foreign bodies, fractures, dislocations, typical ulcers and cancers become comparatively simple and easy. We can, for example, locate a high percentage of gall stones, pathological gall bladders, and renal stones. We are always, however, confronted with the possibility of error due to the size of the patient and to the fact that on an x-ray plate we cannot obtain perspective. We may very easily confuse renal stones, gall stones, and calcified mesenteric lymph nodes, or even fecoliths, so that in most cases it is advisable to have as complete medical and laboratory examinations as possible in addition to the x-ray examination. I will say that I am convinced that when, in cases diagnosed by us as renal stone, the surgeon merely needles the affected kidney and finding no stone in this way, disputes our diagnosis, the x-ray diagnosis may still be reasonably judged accurate until definitely proven otherwise at autopsy or at a subsequent operation, because undoubtedly it may be perfectly possible to miss finding a stone merely by probing with a needle.

Did we have facilities at hand more often for injecting bismuth paste into sinuses, collargol, thorium, or sterile sodium bromide into kidneys and ureters and other more or less difficult procedures, undoubtedly we should score higher records for correct diagnoses. Injection of air into the ventricles of the brain or into the peritoneal cavity gives brilliant results, but I can hardly see how with our routine x-ray work such procedures are either advisable or necessary.

Chest cases are particularly interesting and satisfactory. We can definitely and accurately define the size of the heart, the presence or absence of aneurysm or aortitis, and the limit of diaphragmatic excursions. We can definitely determine the presence of tuberculosis in a large number of cases in which the physical signs may be either indefinite or absent. A persistent or enlarged thymus, pleural thickening, fluid or air in the chest cavity, cavities, or lung abscesses, hilus or peribronchial thickening, areas of consolidation, can all be definitely located on an x-ray plate. We do confuse the mottling of the lungs remaining after influenza with tuberculosis; but providing six months have elapsed since the influenza, this source of error can be discounted. After an x-ray diagnosis of fluid or pus in the chest cavity, the report frequently comes back to us that no fluid or pus could be located by pleurocentesis; but pus or fluid may be encapsulated and therefore not easily found with a needle and the diagnosis may still be open to question.

Obscure bone lesions are interesting. We can definitely show sarcomata cysts, fractures, deformities, periosteal thickening, decalcification, all sorts of unusual conditions and diseases which might otherwise escape detection until too late. With the proper technique and by always taking both sides (for example, both the right and left arm, foot, leg, ankle, etc.), minute differences in bony structure can often be made out. Many radiologists claim it is impossible to detect osteomyelitis before the second or third day after the onset of the symptoms or even later than that. This is often the case, but I have seen many cases where from the first day a scarcely noticeable difference in the texture of the affected bone could be demonstrated on the x-ray plate. I can only describe it as an obliteration, a clouding over of the delicate pencilling of the bony structure as compared with the corresponding bone of the opposite side.

As for joints, I always compare the affected joint with its fellow on the opposite side. Only thus am I able to make even an attempt at diagnosis. A cloudiness, a slight feathery fibrillation, roughness or flattening of the articular surface can only thus be detected. Of course the technique in taking the x-ray must be identical for each joint or it would be worse than useless to compare the two sides; and needless to say, the dark room technique in developing the plates must be accurate.

I am convinced the x-ray can discover *Bacillus aerogenes capsulatus* infection long before it is suspected by the clinician. Frequently, of course, we get unusual bone lesions; Paget's disease, scurvy, syphilitic anomalies, metastatic carcinomata, etc., that puzzle us sorely and form many a point of contention between us and the clinician and cause endless worry, trouble and dispute.

But it is the gastro-intestinal cases that puzzle and worry me most, and I know that other radiologists have the same difficulties and worries over their cases. As I said before, it used to be the accurate diagnoses I made that interested me most; now I am particularly interested in my mistakes. I have been basing most of my conclusions and diagnoses on my x-ray findings alone and several times I have been very much mistaken and disappointed. True, this disappointment has been offset many times by finding by x-ray some hitherto entirely unexpected gastric lesions, when from the x-ray findings alone an operation has been judged imperative.

These are the cases that puzzle me; very stout patients who are difficult to fluoroscope, difficult to get good plates on, and who apparently have classical gastric symptoms. Hysterical and neurotic patients with indefin gastric symptoms come next. These often show by x-ray apparent filling defects or anomalies in gastric outline relieved by the administration of atropine to the physiological limit. I have often wondered whether many of these patients might not after all be suffering from small submucous ulcers of the gastric mucosa which heal and reappear at intervals much as do the cankers of the mouth from which many individuals suffer. Frequently such cases are operated on, since the x-ray apparently justifies the diagnosis of ulcer, and no ulcer is found. When no ulcer is found on inspection of the outer wall of the stomach, of course the radiologist is criticized. True, many filling defects (irregularities in outline) of the stomach may be caused by a reflex gastro-spasm due to a diseased appendix, gall bladder or other intra-abdominal condition; but in the absence of any such obvious cause, why blame the gastro-spasm to hysteria? Why not to small, easily healed ulcerations?

Quite frequently ulcers which escape detection by the x-rays are found at operation. These are generally situated on the anterior or posterior wall of the stomach. They are unaccompanied by any gross demonstrable filling defect or incisura. They very frequently cause a marked rapidity of emptying of the stomach, very rarely a stasis. Stasis I have found occurs rarely except in marked ptosis or when due to some obstruction at the pylorus or duodenum. I have several times carefully examined, by plates and fluoroscope, patients in whom I could find no evidence of the stomach and yet a subsequent operation revealed an ulcer of the stomach. It may be that when we can take a number of plates in rapid succession we may be able to discover otherwise unnoticeable defects in gastric outline. But our percentage of gross mistakes is by no means overwhelming for we can detect the great majority of gastric lesions and we can detect readily adhesions, and definite obstructions of the gastro-intestinal tract by means of the barium meal or enema.

As for x-ray treatment, I wish I might have more time to give you a better idea of the scope of the treatment work and its limitations. We do get results and can prove it. We have to our credit innumerable cases of epitheliomata we have eradicated; we stop uterine hemorrhage quickly, especially in metrorrhagia due to fibroids and reduce markedly the size of these tumors; we can use the rays in the treatment of psoriasis, acne, birthmarks, moles, lupus, ring worms, warts, keloids and a number of other skin lesions with benefit. We reduce the size of the thyroid and reduce the toxemia in Graves' disease. We can reduce the size of a persistent or enlarged thymus. In post-operative cases of cancer of the breast a great many doctors are already using post-operative radiation. In inoperable cases of cancer of the breast and uterus and other organs we can and do decrease the pain, the odor and the discharge, if nothing else. As a rule, we get our treatment cases only after every other remedy has been tried.

One feature especially handicaps us in our work and that is the expense connected with our work. Plates, chemicals, and especially equipment are so expensive that the moderate fees charged at many hospitals do not begin to cover the expenses in the x-ray department. Therefore in institutions which are not endowed we cannot produce the results that are possible in institutions or private offices where lack of money is no obstacle.

There is one point I wish especially to emphasize. It is undoubtedly true that a radiologist who has made a special study of x-ray work and especially of x-ray interpretation, whose eye is trained to analyze chemical fog, imperfect dark room technique, etc., can make an accurate diagnosis from a poor, thin plate, when, to a casual observer, the shadows on the plate mean next to nothing. I know of no x-ray laboratory, not even the best in the country, that can produce absolutely crystal clear x-ray plates all the time, but practically all radiologists can produce plates from which we can make accurate diagnoses most of the time. Good plates, too, can be judged to be poor if viewed with poor illumination. Also it cannot be expected that we can get excellent detail through plaster casts, adhesive strapping, metal splints, etc. I have had several physicians who have sent me patients with limbs still in plaster casts which could not be removed, and apparently they could not understand why I was unable to state definitely whether or not there was any beginning callous formation.

Naturally the best results can be obtained only by using the best equipment, especially the best tubes; and when, as is often the case, the same tube must be used for treatment and all x-ray work, the focal spot on this one x-ray tube becomes blunted and we cannot get beautiful detail. And with a Coolidge tube we cannot ordinarily get the beautiful detail that a gas or hydrogen tube will give, but in a busy hospital laboratory we have not time to be constantly fussing with gas or hydrogen tubes. Most of us do the best work we can with the equipment we have and with the conditions we have to contend with.

THE SURGICAL TREATMENT OF CHRONIC EMPYEMA.

By Wyman Whittemore, M.D., F.A.C.S., Boston.

There seems to be no definite time when an empyema that was once acute should be placed in the chronic class. It may be questionable if it is fair to label as chronic a case which was acute at the beginning, but which leaves the hospital at the end of six or seven weeks with a discharging sinus. I consider that any acute case which is not healed up in six or seven weeks has become chronic. Furthermore, for the purpose of discussion, I shall divide chronic cases into two groups—the early chronic and the late chronic cases. Before taking up these two groups, I wish to state that with an occasional rare exception I believe that all acute empyemata, if correctly operated on and correctly treated after operation, should be healed up within six or seven weeks. In other words, if an acute empyema drains for several months there is probably one of three reasons for it; either it is a neglected case and has not received surgical attention when it should have, or it has been operated on badly, or the after care has been poorly managed. One occasionally has to deal with an individual whose mentality is such that he hinders rather than helps the surgeon in his after care. I well remember a foreigner who persisted in taking his drainage tube out at least once every twenty-four hours; this case became chronic. In this arbitrary division of early chronic cases, it is a question just when one is justified in doing a radical operation in an early chronic case. But I believe on general principles that a radical operation done early will produce better, certainly quicker, results, than if delayed for a year or more. If at the end of six or seven weeks we find the count of organisms in the smear taken from the pleural cavity staying, and persistently staying, up to five, six or seven organisms per field under the high power of the microscope, then I believe it is justifiable and the only correct surgical procedure to do something more radical. At the Massachusetts General Hospital we have had an occasional such case, especially in those cases operated on by means of the closed air-tight suction technique, and we have always taken out a rib.

Two facts in regard to the taking out of a rib are of interest. First: The correct rib to take out is the one just above the drainage, as the diaphragm has always been found to be contracted up to the level of the drainage, so that although the drainage is between the eighth and ninth ribs, if one should take out the ninth or tenth rib one would immediately get into difficulties with the diaphragm. Second: We have always found a very small cavity, one perhaps as large as a hen's egg, or even smaller; never, I believe, larger. This cavity if opened up wide and packed with gauze, has rapidly healed up. In other cases we have found that the cavity at the end of two or three months shows no tendency to become smaller, in spite of good drainage and the thorough use of Dakin's solution. In these cases I believe in doing a more radical operation at once, rather than waiting six months or a year. This radical operation is exactly the same as that done in the late chronic cases and will be taken up in its own place.

In the late chronic cases, one can have a persistent discharging sinus from a large cavity and also from a small cavity. A chronic case on entering the hospital has a culture and x-ray taken and then a small tube or catheter is put through the sinus as far up into the cavity as possible and irrigations with Dakin's solution started and kept up until the cavity is as sterile as possible. The common cultures are staphylococci plus either pneumococci or streptococci, or all three. We can usually get rid of the pneumococci and often the streptococci, but seldom all of the staphylococci. The small cavities can be cured, after they are located, by opening them up wide and packing them with gauze or by the Carrel-Dakin method. The large cavities are difficult to cure. I agree with the observation made by Dr. John Homans of the Peter Bent Brigham Hospital, that if the lower lobe of the lung is adherent to the diaphragm the prognosis is better than if it is not. In the cases in which the lung is shriveled up to a small mass about the root of the lung, especially if the lung contains a large amount of fibrous tissue, I believe there is no operation that will do much towards making the lung expand again. Whether or not in the large cavities, with or without the lung being adherent to the diaphragm, good drainage and persistent use of the Dakin's solution will entirely cure the cases is a question. It has been stated by excellent authority, the Empyema Commission, that it will. They claim Dakin's solution will gradually dissolve the thick pyogenic membrane off the costal and visceral pleurae and the lung will then entirely expand. I do not question this observation but can merely state that in a series of cases of my own in which I have tried this method I have never had a successful case. In the large cavities, after one has gotten them as sterile as possible, especially if one can get rid of the streptococci, then I believe a decortication is the only surgical procedure to be considered. But one should carefully pick the case and carefully prepare it for operation. Patients thirty years of age or under will do better than those forty or over. A decortication may be done either by means of a long incision between the ribs, which are then retracted far apart, or those ribs overlying the cavity may be resected. I personally prefer this latter way as it permits one to get rid of the costal pleura more easily and as all cases are not brilliant successes and the lung does not always fully expand. the chest wall will help obliterate the cavity in those cases in which the lung does not fully expand. After the decortication the lung should be blown up. In the most favorable cases the lung will fully expand, in the others it will expand part way to the chest wall. With the lung blown up the wound should be closed air tight. A small catheter or rubber tube that is shut off should be sewed in tightly at the bottom. Twenty-four hours after operation the bloody serum that has collected in the pleural cavity should be sucked out. The after care should be such that no air is allowed to enter the pleural cavity. Irrigations with Dakin's solution are started forty-eight hours after operation and kept up until there are no organisms at all. This takes in the average case six or seven weeks.

Fifteen years ago a decortication was considered a very dangerous operation and I remember Dr. Maurice H. Richardson saying that he would not do it unless the patient no longer cared about living. Today if one selects the proper case and carefully prepares it for operation, I do not believe it is a very dangerous operation.

In a small series of fifteen decortications I have had no mortality. Eleven cases healed up and remained so, two are still discharging a very small amount of pus after ten months and eleven months, respectively, but both are in good physical condition and do not wish any further surgery. Two cases have not been traced. In a series of nineteen cases having small cavities in which the costal pleura was excised and the cavities either packed with gauze or treated with the Carrel-Dakin method, fifteen healed promptly and have remained so, one is still draining, and three have not been heard from. There was no mortality.

In this series of thirty-four cases of chronic empyema, twenty-six have become entirely well, three cases are not healed and the remaining five have not been traced. There has been no mortality.

In looking over these statistics I feel that these unfortunate cases should no longer be considered as once they were, practically hopeless, but that the hope of ultimate recovery which can now be held out to them is very much greater than ever before.

Clinical Department.

AN UNUSUAL CASE OF MYELITIS.

By Arthur L. Kinne, M.D., Holyoke, Mass.

The following history is so unusual as to warrant putting it on record.

Patient, Mr. E. C., a bank clerk, a large, athletic man, thirty-seven years old, and a widower, was first seen in my office October 13, 1919. At that time he complained of having a "cold," with a slight cough and a sore throat. The temperature was 99, physical examination negative save for a reddened and injected pharynx. The condition appearing to be a tracheitis and pharyngitis, the patient was given a mild expectorant mixture and told to remain indoors. Two days later I was called to the patient's home, at which time he presented the picture of a mild influenzal infection with a temperature of 100.6, headache, general malaise, and a hard, dry cough. Examination at this time showed nothing except a very red throat and a few crackles at the bases of both lungs.

Early the next morning I was called and told that the patient could not void. When seen he was very uncomfortable from retention and the bladder extended half way to the umbilicus. He was catheterized immediately and then stated that he had noticed his legs beginning to feel numb and that he could not move them. Upon examination he was unable to move either leg and had lost all sensation below a line across the abdomen just below the level of the umbilicus. The knee jerks were present but very much diminished, there was no Babinski or ankle clonus. Questioning as to his previous history revealed nothing of importance and he denied venereal disease.

On October 18th, he was examined thoroughly in company with Dr. G. D. Henderson. At this time there was a spastic paralysis of the lower extremities, the knee jerks were very much exaggerated, equally so on both sides; there was a marked Babinski on both sides and a slight ankle clonus. The cremasteric reflexes were lost, the abdominal reflexes were present. There was an absolute motor paralysis of both legs and complete anesthesia below a line across the abdomen below the umbilicus. There was a complete retention of urine and considerable bowel distention, a little gas being passed at times. Wassermann at this time was negative, and x-ray of spine was negative. Temperature, 98.6; pulse, 80. W. B. C. 15,800 with 85% polymorph. neutrophiles. A spinal puncture was not done. The findings seemed to warrant a diagnosis of a transverse myelitis of infectious origin, originating from a respiratory infection.

The patient's condition remained unchanged until October 27, a catheter being fastened in the bladder most of the time. On this date the patient noticed that he could move both legs a little and that there was some feeling in them. On October 30, patient developed a temperature of 102, probably from urinary infection, and on October 31 he voided for the first time since the onset of the paralysis. From this time on he improved rapidly, sensation returned and the motor power became stronger daily. On November 10 he was allowed out of bed and a few days later insisted on being allowed to walk a few steps. At this time the Babinski had disappeared, but the knee jerks were very active. Improvement continued steadily and on December 20 the patient was back at work feeling a little weak but able to walk perfectly well and with all reflexes normal except perhaps a slight increase in the knee jerks.

The treatment of this patient was purely symptomatic throughout the illness. Hexamethylenamine and sodium benzoate were given at the beginning, calomel and salines were used to procure elimination, bromides and barbital for restlessness. The patient was turned in bed every two or three hours and was given frequent alcohol rubs. Constant drainage was kept in the bladder, the catheter being removed at intervals, and the bladder was irrigated once daily with a boric solution. Enemata were used when needed.

SUMMARY.

A vigorous man, 37 years old, was taken with a mild respiratory infection, apparently not serious, and developed a few days afterward an absolute paralysis of the lower extremities, the bladder and the bowel. The condition was stationary for a little over two weeks, when patient began to recover both motion and sensation and from this time on recovery was extremely rapid, so that inside of two months he was back at his usual work.

◆

Book Reviews.

The Operative Treatment of Chronic Intestinal Stasis. By Sir W. Arbuthnot Lane, Bart., C.B. Consulting Surgeon to Guy's Hospital, and to the Hospital for Sick Children, Great Ormond Street. Fourth Edition, revised and enlarged. London: Henry Frowde, Oxford University Press; Hodder & Stoughton, Warwick Square, E.C. 1918.

No one should read this book without first reading slowly and carefully the preface, written specially by Mr. Lane for this new edition. This preface contains only five pages, but it gives a valuable and accurate indication of the character of the three hundred which follow.

About half the book is from the pen of Mr. Lane; the remainder is written in a dozen chapters by other well-known British medical men: among them, Mr. Keith, the anatomist, and Sir James MacKenzie.

After finishing the preface, and before beginning a systematic examination, the prospective student should also read carefully the paragraph on page eighty-six, which we quote literally.

"I will begin with rheumatoid arthritis.

"What can be more startling than the effect of colectomy upon a case of acute rheumatoid arthritis? One sees a patient who has lain on her back in agony for many months, or even years, dreading any movement in her swollen and painful joints. Within twenty-four hours after the colon has been removed the patient is able to move every joint in which bony anklosis had not previously existed with great freedom and with absence of pain."

If this appeals to him, he may proceed at once to a more thorough examination of the volume; but if it does not appeal, further reading will probably not change his opinion.

The expression "chronic intestinal stasis" seems to mean what has previously been described as "constipation." It is probably true that as doctors grow older, a large majority of them come to regard constipation as a more serious menace to health than they did when they graduated from their medical schools. But to follow Mr. Lane to his extraordinary conclusions will still remain, in the opinion of the reviewer, beyond the power of most physicians—whether old or young—and this is fortunate.

The title of the book is a misnomer since the only pages really devoted to operative treatment are from page seventy-four to page eighty-three. The other three hundred pages are either a discussion of treatment in general, or an exposition of the views and theories of Mr. Lane and others on chronic intestinal stasis; or on subjects which seem to them related in some way to this condition. In other words, this volume may be interesting but it is not convincing; it calls to mind the old saying, "If people like this sort of a book, then this is the sort of book that such people will like."

The type, diagrams, pictures and binding are better than the average.

Oxford Loose-Leaf Surgery. By various authors. Edited by F. F. Burghard, M.S. (Lond.), F.R.C.S. (Eng.), Colonel, A. M. S.; Lecturer on Surgery and Surgeon to King's College Hospital; Consulting Surgeon to the

Children's Hospital, Paddington Green, London, Eng.; and **Allen B. Kanavel**, A.B., M.D., F.A.C.S., Lieut. Col. U. S. A.; Associate Professor of Surgery Northwestern University Medical School; Attending Surgeon, Wesley and Cook County Hospitals, Chicago, Ill. In five volumes, over 1800 illustrations. Volume I. New York; Oxford University Press, American Branch: 35 West 32nd Street, London, Toronto, Melbourne, and Bombay. 1918.

The first of the five volumes which are to make up the completed work, is a book of a little less than 1000 pages, printed in large, clear type on good paper, and illustrated by 350 pictures. Unlike many text-books, the cuts have not been reduced but remain of large size, sharp in outline, excellent in drawing, and in most cases original.

In the brief half-page preface, signed by both the American and the English editor, the aim of the work is outlined:

"Surgery is no longer 'a mere mechanic art.' Out of the old surgery which placed so great a stress upon technique a new surgery is being evolved, a new conception is being formed, the application of which belongs to no passing event, the future of which no one can prophesy.

"Functional surgery, if one may use the term, belongs to all the future. Take, for example, abdominal diagnosis, where the mechanism of pain is a question of vast complexity, and the evaluation so essential to diagnosis. Again, the latter-day investigation of anaesthesia opens a new field and warns the surgeon that every function of the nervous system must be given detailed consideration. The study of antiseptics has linked Ehrlich's conception of chemical action with the daily technique of the operation room and extended the domain of bacteriology in the scientific treatment of wounds. It is such advances as these that we have attempted to incorporate with the portrayal of the technique of various surgical clinics. The foundation was found in Burghard's Surgery, whose various contributors in collaboration with the editors have added proved procedures from American clinics and revised the various chapters in the light of the developments in surgical practice produced by experience in war."

We may assume that the editors considered carefully the size of this new surgery before deciding in favor of five volumes; the arguments for and against so large a work are familiar to all. The loose-leafed system, if it shall be found to be mechanically equal to the demands necessarily placed upon it, certainly diminishes the force of the most effective argument against big systems; *i.e.*, that the first volume needs revision as soon as the last one is issued; loose-leafed encyclopedia have worked well; perhaps the loose-leafed surgery will be equally successful.

The contributors to the first volume are,—Percy Sargent, M.B., B.C. (Cantab.), F.R.C.S. (Eng.), D'arcy Power, M.B., (Oxon.), F.R.C.S.; Dunlap Pearce Penhallow, S.B., M.D., (Harv.); C. H. Browning, M.D., D.P.H. (Oxon); Major J. W. H. Houghton, M.B., B.C. (Dub.); P. L. Guiseppi, M.D., F.R.C.S.; H. Edmund G. Boyle, M.R.C.S., L.R.C.P.; A. Goodman Levy, M.D.

The proportionate amount of space given to the various subjects does not seem well determined; for instance, the section on Amputations is unnecessarily long; nearly 200 pages: the same is true of Ligation of Arteries, 112 pages: while Anesthesia is given only 60 pages.

The section on Anesthesia is not satisfactory. Ether and chloroform are omitted entirely (except for a brief chapter on "chloroform deaths"). Novocain or procain is not mentioned in Local Anesthesia, and recent work of scientific value in the chemical aspects of anesthesia is not described. On the other hand, hyoscine-morphine twilight sleep in obstetrics might be omitted.

Section VII. Injuries of Joints, 100 pages, by Sir Robert Jones is the best in the book; and Dr. Bristow's chapter upon the treatment of Joint and Muscle Injuries also deserves commendation.

On the whole, the work may be said to promise well, and merits careful examination and study.

DIRECTORY OF THE MASSACHUSETTS MEDICAL SOCIETY.

Included in the present issue of the Journal will be found the annual Alphabetical List or Directory of the Masachusetts Medical Society, corrected to April 1, 1920. This group of pages is so arranged that it either may be bound in place with the volume, or may be taken from the Journal and used as a separate entity by any who wish to detach it for this purpose.